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# ON THE REPRESENTATION OF IGNEOUS ROCKS IN TRIANGULAR DIAGRAMS

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It has been customary to represent three components in a triangular diagram by a dot, or four components by a triangle within the triangle. The writer, by means of only a dot and a line, plots without the use of a slide rule or any calculation whatsoever, the actual percentages of quartz, orthoclase, plagioclase, and dark minerals as well as the relative percentages of quartz, orthoclase, and plagioclase among the light constituents.

Let it be required to plot a rock with the following mode:[1]

| | | |
|---|---|---|
| Quartz | 14= | 18.7 |
| Orthoclase | 15= | 20.0 |
| Plagioclase | 46= | 61.3 |
| | 75 | 100.0 |
| Dark minerals | 25 | |
| | 100 | |

The usual method is to reduce to 100, by means of a slide rule, the sum of the percentages of the minerals represented in the three corners of the diagram, and plot the point so obtained. The writer's method is shown in the figure. Draw three lines, parallel to the sides of the triangle, through the points representing the amounts of the corner minerals in the rock, in this case a horizontal line through 14 for quartz, a line sloping northeast and southwest through 46 for plagioclase, and a line sloping northwest southeast through 15 for orthoclase. Lay the side of a straight-edge on the apices of the two triangles and draw a short line (*bd*) through the small triangle from its apex to its base. Connect either of the lower corners of the large triangle with the similar corner of the small one, and indicate its intersection with the line first drawn by a dot, *F*. The line *bd* and the spot *F* represent the rock. The point *F* is the same as that which would have been obtained by the slide rule, and gives the relative proportions of the light constituents (quartz [*mF*], orthoclase [*kF*], and plagioclase [*iF*]), in the rock by its distances from the sides of the triangle opposite these names at the corners. The actual percentages of the minerals in the rock are also represented: *bc* or *pk* for orthoclase, *ab* or *io* for plagioclase, *bd* for the dark constituents, *dm* for quartz.

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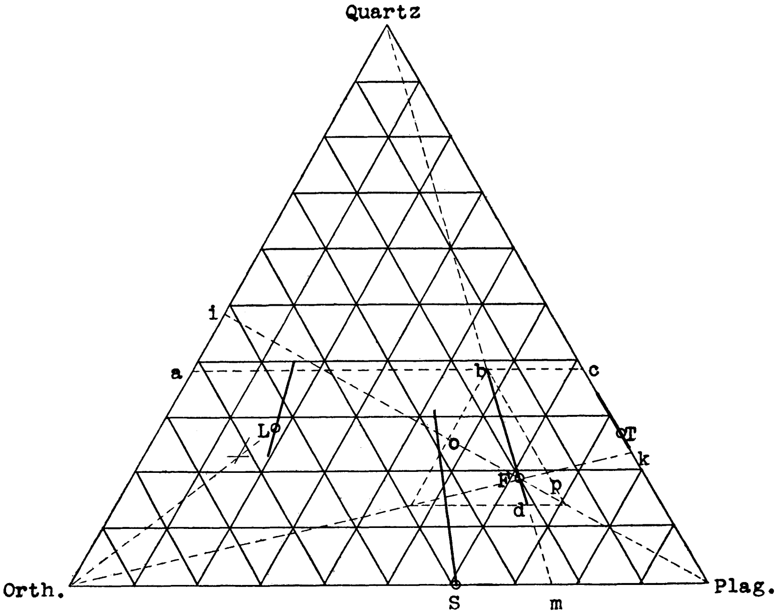
[1] The same method may be used in other ways to show the relative percentages of three components whose sum is not a hundred.



In a similar manner the composition of the rock at *L* may be read directly from the diagram, giving the values:

| | | |
|---|---|---|
| Quartz | 23= | 27.7 |
| Orthoclase | 45= | 54.2 |
| Plagioclase | 15= | 18.1 |
| | 83 | 100.0 |
| Dark minerals | 17 | |
| | 100 | |

The rock at *S* is seen to consist of orthoclase 27 per cent, plagioclase 42 per cent, quartz 0 per cent, and dark minerals 31 per cent. The relative ratios of the light constituents are: orthoclase 39.1 per cent, plagioclase 60.9 per cent, and quartz 0 per cent. The rock at *T* consists of orthoclase 0 per cent, plagioclase 66 per cent, quartz 24 per cent, dark constituents 10 per cent. Relative ratios of the light minerals, plagioclase 73.5 per cent, quartz 26.5 per cent, and orthoclase 0 per cent.

The actual plotting takes much less time than the telling. In fact the small triangle is never plotted. The upper end (*b*) of the line is located at the dividing point between orthoclase (*bc*) and plagioclase (*ab*) on the horizontal line whose length (*ac*) is equal to the sum of the feldspars, and through this point the inclined line is drawn to the percentage position of quartz (*d*). One of the lower corners of the small triangle is located, without drawing it, and the intersection of the inclined line with the ferromagnesian mineral line used to determine the locus of the rock.